Attachment I

Curve Number and Runoff Calculations

Curve Number and Runoff Calculations Worksheet

1- Areas

Areas were measured from the INTEC Title Page Drawing. See Attached.

INTEC Total Area =	6,439,000 SF
TANK FARM AREA	634,000 SF

INTEC FACILITY (Not Including Tank Farm Area) (A2)

Total Area = 6,439,000 - 634,000 = 5,805,000 SF

Impermeable Areas	
Building Area	617,778 SF
Structure Area	125,808 SF
Sidewalk Area	45,315 SF
Paved Area	786,604 SF
Total Impermeable Area =	1,576,000 SF

Total Permeable Area = 5,805,000 SF - 1,576,000 SF = 4,229,000 SF

2- Curve Numbers (CN)

Calculated using method described in SCS Technical Release - 55 (SCS, 1986).

TANK FARM AREA = 98

INTEC FACILTY (Not including Tank Farm A m)
Permeable Area CN = 77
Impermeable Area CN = 98

Composite CN = (77 x 4,229,000 + 98 x 1,576,000) / 5,805,000 = 827

3- Precipitation

The amount of precipitation used for sizing the evaporation pond is based on the 25-yr snowmelt event. This is shown In Figure 7 and is the second largest snowmelt event shown in Figure 5.

26 in

4- Runoff Volume

Calculated using method described in SCS Technical Release - 55 (SCS, 1986).

TANK FARM AREA

Potential Maximum retention after runoff begins
S = (1000/CN) - 10 = 0.20 inches

Runoff (inches)= Q = (P-0.2S)^2/(P+0.8S) = 2.57 in

Runoff Volume = QA = 136,000 Cu. Ft.

INTEC FACILTY (Not Including Tank Farm Area)

Potential Maximum retention *after* runoff begins
S = (1000/CN) - 10 = 2.09 inches

Runoff (inches) = Q = (P-0.2S)^2/(P+0.8S) = 1.27 in

Runoff Volume = QA = 614,000 Cu. Ft.

TOTAL RUNOFF VOLUME= 750,000 Cu. Ft.

Attachment 2

Rip-rap Sizing Calculations

SIZE RIP-RAP

DESIGN SHEAR STRESS: $\tau_d = \gamma_w d S$

where: $\gamma_w = 62.4\ lb/ft^3$
$d = 1.36\ ft$
$S = 0.002\ ft/ft$

$$\tau_d = 62.4 \frac{lb}{ft^3}\left(1.36\ ft\right)\left(0.002 \frac{ft}{ft}\right) = 0.17 \frac{lb}{ft^2}$$

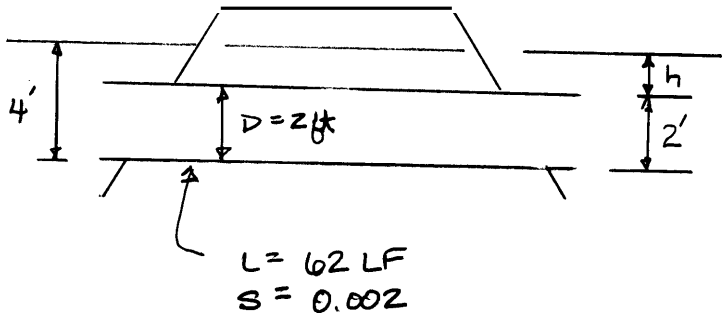
ALLOWABLE SHEAR STRESS, FROM CHART 3.

FOR 1" DIA. RIP-RAP. $\tau_{ALL} = 0.38\ lb/ft^2$

$\tau_d < \tau_{ALL.}$ $\therefore$ OK

SPECIFY 4" to 6" DIA RIP-RAP

SPILLWAY CULVERT CAPACITY



ENTRANCE LOSS, $K_e = 0.9$

$n = 0.024$

$A = \frac{\pi}{4}(2)^2 = 3.14$, $R = \frac{D}{4} = \frac{2}{4} = 0.5$ ft

HEAD LOSS:

$$H_L = \left(K_e + \frac{29 n^2 L}{R^{4/3}} + 1\right)\frac{V^2}{2g} = h$$

AND HEADWATER DEPTH

$H_w = H_L + T_w - S_o L$ OR $H_L = 4 - 2 + .124 = 2.124$

$$2.124 = \left(1.9 + \frac{29(0.024)^2 62}{(0.5)^{4/3}}\right)\frac{V^2}{2g}$$

$V = 5.51$ fps

$Q = 5.51 \times 3.14 = 17.3$ cfs

TOTAL DISCHARGE: 34.6 cfs

Pond Discharge Channel
Worksheet for Trapezoidal Channel

Project Description	
Project File	d:\job files\intec\tank farm interim action\tf inter.fm2
Worksheet	Pond Discharge Channel
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Channel Slope	0.002000	ft/ft
Left Side Slope	2.000000	H : V
Right Side Slope	2.000000	H : V
Bottom Width	10.00	ft
Discharge	34.60	cfs

Results		
Depth	1.36	ft
Flow Area	17.34	ft²
Wetted Perimeter	16.09	ft
Top Width	15.45	ft
Critical Depth	0.69	ft
Critical Slope	0.021740	ft/ft
Velocity	2.00	ft/s
Velocity Head	0.06	ft
Specific Energy	1.42	ft
Froude Number	0.33	
Flow is subcritical.		

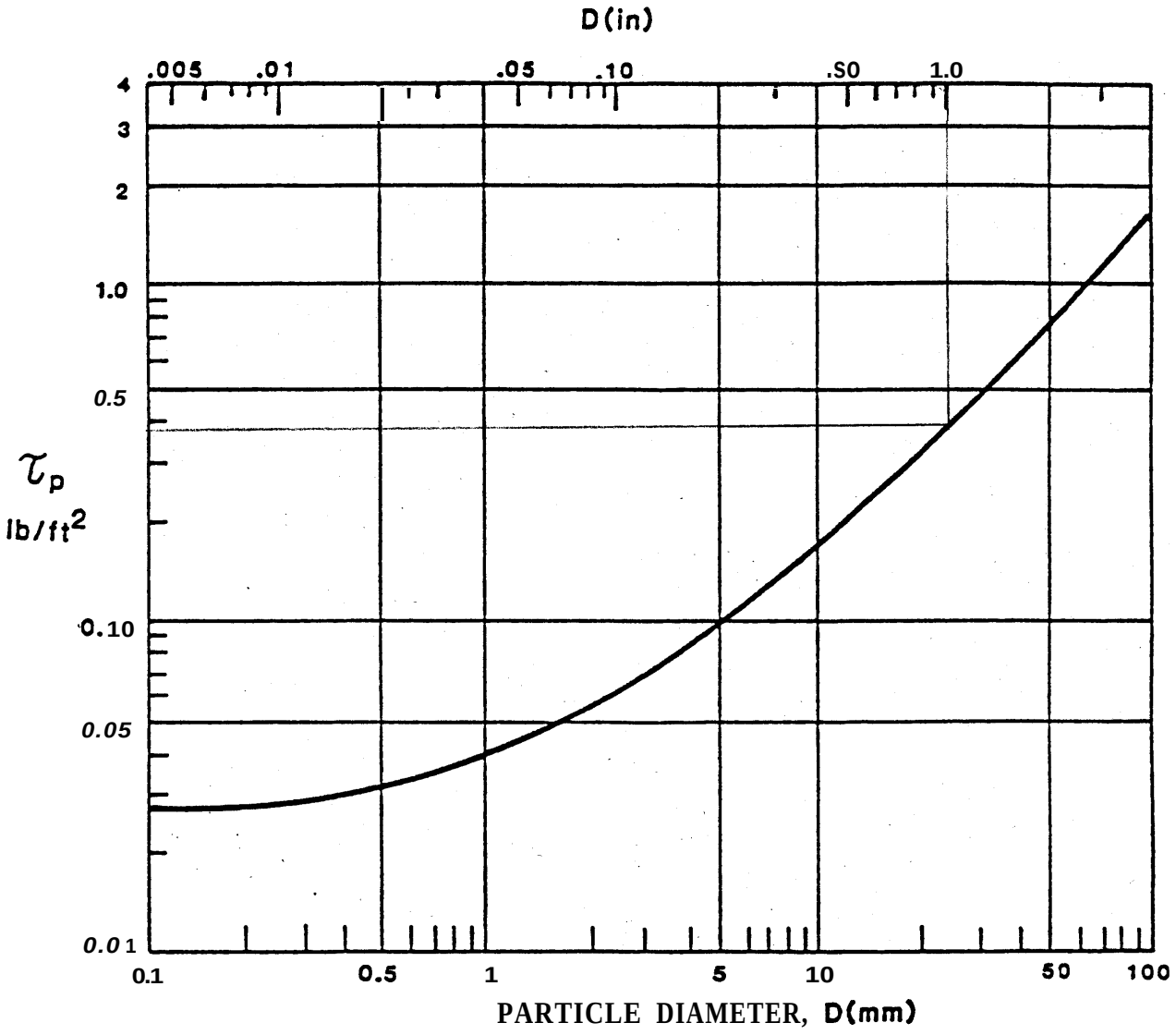


Chart 3: Permissible Shear Stress for Non-cohesive Soils (From HEC-15)

File 7354

NEEL

Idaho National Engineering & Environmental Laboratory

INTEROFFICE MEMORANDUM

Date: October 27, 1999

To: R. Lee Davison MS 3953 526-3770

From: Peggy J. Jessmore pjj MS 3953 526-9367

Subject: SAFETY ANALYSIS AND UNRESOLVED SAFETY QUESTION – OPERABLE UNIT (OU) 3-13 TANK FARM INTERIM ACTION, PHASE 1 – PJJ-01-99

Attached are the approvals for the *Request for Determination of Safety Analysis Requirements*, and the *Unresolved Safety Question Safety Evaluation Screening for Facility Modifications* for Phase 1 of the OU 3-13 Interim Action. Please place these in the OU 3-13 project files. If the scope of Phase 1 is modified to include changes to the tank farm structures or soil shielding above the tanks within the INTEC tank farm fence, these documents will need to be re-evaluated.

PJJ

Attachment

cc: Robert E. James, MS 3953
ARDC File, MS 3922
Peggy J. Jessmore Letter File

431.12
08/24/98
Rev. 01

REQUEST FOR DETERMINATION OF SAFETY ANALYSIS REQUIREMENTS

Date: 10/13/99

A. To Be Completed by Project Manager, Project Management Department

1. Project OU 3-13 Phase I Tank Farm Interim Action

Project Manager Randy L. Davison Mail Stop 3953

Type: ☐ Line Item ☐ GPP ☐ CE ☐ Work Order ☐ Other _____

2. Reference Documents Submitted:

Check the documents submitted with this request:

- ☐ Technical Functional Requirements
- ☐ Design Criteria
- ☐ Conceptual Design Report
- ☐ Environmental Evaluation or EIS
- ☐ USQ Screening
- ☐ Feasibility Studies
- ☐ Project Plan
- ☐ Work Order
- ☐ Engineering Change Form
- ☐ Other _____

B. To Be Completed by the Cognizant Safety Analysis Organization

Task Number _____

1. New Facility Project:

PSAR required before facility construction?	☐ Yes	☒ No
New SAR or revision/addendum to an existing SAR required before operation?	☐ Yes	☐ No
Will this be a nuclear facility (see MCP-2446)?	☐ Yes	☒ No

2. Existing Facility Modifications:

USQ evaluation required?	☐ Yes	☒ No
Revision/addendum to an existing SAR required?	☐ Yes	☒ No
Descriptive changes to an existing SAR required?	☐ Yes	☒ No

Hazard category/classification Tank Farm area is Hazard Cat 2 facility

3. Justification for Items B.1 - B.2:
This project will not change or modify the tank farm structures or soil shielding above the tanks. All heavy equipment usage on or around the tank farm area must be in compliance with the requirements of TS 4.2B14 for load controls. Safety analysis or safety document revisions are not required for this project.

4. Proposed schedule for Company and DOE approvals of required Safety Analysis:
Not applicable

Request for Safety Analysis Approval

E. E. Hochhalter	E. E. Hochhalter	10/25/99
Manager, Safety Analysis Unit/Department Print/Type Name	Manager, Safety Analysis Unit/Department Signature	Date

Distribution: Copy for Project Manager; original and one copy to Safety Analysis. Original back to Project Manager when Safety Analysis determination is completed.

The **OU** 3-13 Interim Action Phase **I** scope of work includes upgrading existing surface and building drainages, installing new drainage ditches, and constructing new storm water collection pondsd at INTEC. The objective in performing this work is to direct/control precipitation run-on away from the tank farm area, as mandated in the Record of Decision. Upgrading existing surface drainages consists of removing the exising rock currently lining the ditches, adding **sub** base and concrete linings. Upgrading existing building drainages consists of upgrading, adding or redirecting existing rain gutters away from the tank farm area. Excavation, and addition of **sub** base and concrete lining will be required for the new drainage ditches. New culverts and a new fence will also be installed at various project locations. All drainage ditches will be routed to the new storm water collection ponds, constructed outside the INTEC facility fence. Construction of these ponds requires excavation, dirt moving, and compaction, using heavy equipment. This field work is scheduled to begin in August 2000 and end in January 2001.

431.19B
06/12/98
Rev. 00

USQ SAFETY EVALUATION SCREENING FOR FACILITY MODIFICATIONS

Nuclear Facility or Activity: Tank Farm

USQ Determination No.: 99-USQ-4.2-007S Revision No.: _____

Title of Proposed Modification: OU 3-13 Phase I Tank Farm Interim Action

Describe the Proposed Modification and its potential effects:

The OU 3-13 Interim Action Phase I scope of work includes upgrading existing surface and building drainages, installing new drainage ditches, and constructing new storm water collection pondsd at INTEC. The objective in performing this work is to direct/control precipitation run-off away from the tank farm area, as mandated in the Record of Decision. Upgrading existing surface drainages consists of removing the existing rock currently lining the ditches, adding sub base and concrete linings. Upgrading existing building drainages consists of adding or redirecting existing rain gutters away from the tank farm area. Excavation and addition of sub base and concrete lining will be required for the new drainage ditches. New culverts and a new fence will also be installed at various project locations. All drainage ditches will be routed to the new storm water collection ponds, constructed outside the INTEC facility fence. Construction of these ponds requires excavation, dirt moving, and compaction, using heavy equipment. This field work is scheduled to begin in August 2000 and end in January 2001.

List the reference location(s) of safety requirement(s) in the authorization basis or any Technical Safety Requirement (TSR) related to the Proposed Modification:

PSD 4.2, "Aqueous Liquid Waste Management"
Associated 4.2 series of TS/Ss

USQ Screening:

Could the change adversely affect the safety function of a structure, system, or component (SSC) or part of a larger SSC described in the authorization basis? Consider the following specific possibilities as a minimum.

		YES	NO
1.	Could the operability or effectiveness of instrumentation important to safety be degraded?	☐	☒
2.	Could the change adversely affect the ability or a shielding structure to mitigate the consequences of a criticality accident of other major radiation incident?	☐	☒
3.	Could the change adversely affect an HVAC exhaust air filtration system in controlling airborne radioactivity releases to the environment or in mitigating the consequences of an accident?	☐	☒
4.	Could the change adversely affect the integrity of a fuel storage rack or storage fixture?	☐	☒
5.	Could the change result in a criticality scenario different from those considered in the authorization basis (for example, different assembly mechanism, composition or configuration of a postulated critical array)?	☐	☒
6.	Could a plant protection system be adversely affected?	☐	☒
7.	Could the change adversely affect a safety class or safety significant design feature, an engineered safety feature (ESF), or other equipment important to safety?	☐	☒
8.	Could construction-related activities adversely affect a safety function?	☐	☒

The answer to any of questions 1 through 8 above is "Yes", a USQ safety evaluation must be performed and documented on Form 431.20, USQ Safety Evaluation, or equivalent (see MCP-123).

Provide an explanation of the screening results below:

431.198
06/12/98
Rev. *00*

USQ SAFETY EVALUATION SCREENING FOR FACILITY MODIFICATIONS

This project is upgrading the existing surface and building drainages, installing new drainage ditches, and constructing new storm water collections ponds at INTEC. All work around the tank farm area using heavy equipment must be performed within the load restrictions identified in TS4.2B14.

E. E. Hochhalter	E. E. Hochhalter	10/25/99
USQ Screener (Type Name)	USQ Screener (Signature)	Date

File 7354

431.12
08/24/98
Rev. 01

REQUEST FOR DETERMINATION OF SAFETY ANALYSIS REQUIREMENTS

Date: 01/26/00

A. To Be Completed by Project Manager, Project Management Department

1. Project OU 3-13 Phase 2 Tank Farm Interim Action

Project Manager R. Lee Davison Mail Stop 3953

Type: ☐ Line Item ☐ GPP ☐ CE ☐ WorkOrder ☐ Other _____

2. Reference Documents Submitted:

Check the documents submitted with this request:

- ☐ Technical Functional Requirements
- ☐ Design Criteria
- ☐ Conceptual Design Report
- ☐ Environmental Evaluation or EIS
- ☒ USQ Screening
- ☐ Feasibility Studies
- ☐ Project Plan
- ☐ Work Order
- ☐ Engineering Change Form
- ☐ Other Work Scope Description

B. To Be Completed by the Cognizant Safety Analysis Organization

Task Number _____

1. New Facility Project:

PSAR required before facility construction?	☐ Yes	☒ No
New SAR or revision/addendum to an existing SAR required before operation?	☐ Yes	☒ No
Will this be a nuclear facility (see MCP-2446)?	☐ Yes	☒ No

2. Existing Facility Modifications:

USQ evaluation required?	☐ Yes	☒ No
Revision/addendum to an existing SAR required?	☐ Yes	☒ No
Descriptive changes to an existing SAR required?	☐ Yes	☒ No

Hazard category/classification N/A

3. Justification for Items B.1 - B.2:

This project is performing a surface grading of the Tank Farm to create positive drainage. Safety analysis for this work is not required, provided the load limits and soil shield thicknesses are not changed.

4. Proposed schedule for Company and DOE approvals of required Safety Analysis:

N/A

Request for Safety Analysis Approval

E. E. Hochhalter	E. E. Hochhalter	2/8/00
Manager, Safety Analysis Unit/Department Print/Type Name	Manager, Safety Analysis Unit/Department Signature	Date

Distribution: Copy for Project Manager; original and one copy to Safety Analysis. Original back *to* Project Manager when Safety Analysis determination is completed.

The OU 3-13 Tank Farm Interim Action Phase 2 scope of work consists of the following:

- Surficial grading of the tank farm area (TFA) to create positive drainage. It is anticipated that current load restrictions will not be affected by the redistribution of soils during the grading process. This will be accomplished by redistributing equal volumes of cut and fill within the same zone, which is permissible and does not affect load limitations.

- Installation of two swales/ditches within the tank farm to direct water out of the TFA.

- Surface sealing the entire TFA with a poly urea spray on coating.

Penetration below the current liner is anticipated, but will be avoided where possible. A *grading* plan is currently in progress. It is anticipated that soil within the tank farm will remain in the tank farm, however, this may change depending on the results of the grading plan.

File 7354

431.12
08/24/98
Rev. 01

REQUEST FOR DETERMINATION OF SAFETY ANALYSIS REQUIREMENTS

Date: 2-24-00

A. To Be Completed by Project Manager, Project Management Department

1. Project INTEC Polyurea Demonstration

Project Manager Michelle Kaptein Mail Stop 3953

Type: ☐ Line Item ☐ GPP ☐ CE ☐ WorkOrder ☐ Other Product demo.

2. Reference Documents Submitted:

Check the documents submitted with this request:

- ☐ Technical Functional Requirements
- ☐ Design Criteria
- ☐ Conceptual Design Report
- ☐ Environmental Evaluation or EIS
- ☐ USQ Screening
- ☐ Feasibility Studies
- ☐ Project Plan
- ☐ WorkOrder
- ☐ Engineering Change Form
- ☒ Other Demonstration Plan

B. **To Be Completed** by the Cognizant Safety Analysis Organization

Task Number

1. New Facility Project:

PSAR required before facility construction?	☐ Yes	☒ No
New SAR or revision/addendum to an existing SAR required before operation?	☐ Yes	☒ No
Will this be a nuclear facility (see MCP-2446)?	☐ Yes	☒ No

2. Existing Facility Modifications:

USQ evaluation required?	☐ Yes	☒ No
Revision/addendum to an existing SAR required?	☐ Yes	☒ No
Descriptive changes to an existing SAR required?	☐ Yes	☒ No

Hazard category/classification N/A

3. Justification for Items B.1 - B.2:

This is a demonstration project for application of a spray-on poly Urea product. This demonstration does not require safety analysis

4. Proposed schedule for Company and DOE approvals of required Safety Analysis:

N/A

Request for Safety Analysis Approval

E. E. Hochhalter	E. E. Hochhalter	3/20/00
Manager, Safety Analysis Unit/Department Print/Type Name	Manager, Safety Analysis Unit/Department Signature	Date

Distribution: **Copy for** Project Manager; original and one **copy** to Safety Analysis. Original back to Project Manager when Safety Analysis determination is completed.

Describe the Proposed Test/Experiment and its potential effects:

A test area at INTEC will be sprayed with poly urea, which is a spray on applied impermeable product. This demonstration is required to determine product performance and bonding capabilities to various materials.

List the reference location(s) of safety requirement(s) in the authorization basis document(s) (i.e., SAR, BIO, TSRs, OSRs) related to the Proposed Test/Experiment:

INTEC Faciltiy Specific SARs and Plant Safety Document Sections.

USQ Screening:	**YES**	**NO**
1. Could this test or experiment introduce conditions or materials other than those described in the authorization basis for the facility/activity?	☐	☒
2. Could the conduct of this test or experiment adversely affect approved margins of safety described in the authorization basis, either during normal operations or during anticipated or unlikely transients (abnormal conditions)?	☐	☒
3. Could the conduct of this test or experiment adversely affect the adequacy of structures, systems, or components (SSCs) intended to prevent or mitigate accidents?	☐	☒
4. Is this a post-modificationtest or experiment which was not considered in the USQ screening or safety evaluation for the modification?	☐	☒

If the answer to any of questions 1, 2, 3, or 4 above is Yes", a **USQ** safety evaluation must be performed and documented on Form 431.20, USQ Safety Evaluation, or equivalent (see MCP-123).

Provide an explanation of the screening results below:

This is a demonstration project that is testing a spray on product on the ground surface between TB-6 and the tank farm. This demonstration project does not impact the Tank Farm authorization basis, which is a nuclear facility.

E. E. Hochhalter	E. E. Hochhalter	3/20/00
USQ Screener (Typed Name)	USQ Screener (Signature)	Date